04-SC-002-PED, 03-05: 04-CH-108-0
05-R-321, Center for Functional Nanomaterials,
Brookhaven National Laboratory, Upton, New York

1. Design and Construction Cost/Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 2004 Preliminary Estimate....	2Q 2004	1Q 2005	3Q 2005	1Q 2008	79,700	81,000
FY 2005 Preliminary Estimate…	4Q 2003	4Q 2004	3Q 2005	2Q 2008	79,700	81,000
FY 2006 Preliminary Estimate…	4Q 2003	4Q 2004	3Q 2005	2Q 2008	79,700	81,000

The Performance Baseline is expected to be validated by May 2004. No funding will be used for construction until the Performance Baseline has been validated.

2. Financial Schedule

(Dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
04-SC-002-PED, 03-05: 04-CH-108-0			
PROJECT ENGINEERING & DESIGN (PED)			
2003	988 [1]	988 [a]	733
2004	2,982 [a]	2,982 [a]	3,169
2005	2,012	2,012	1,821
2006	0	0	259
05-R-321			
CONSTRUCTION			
2005	18,465 [a]	18,465 [a]	13,801
2006	36,553 [a]	36,553 [a]	34,983
2007	18,700	18,700	23,355
2008	0	0	1,579

[1] PED funding was reduced $12,000 as a result of the FY 2003 general reduction restored in FY 2005.
[a] PED funding reduced by $17,700 as a result of the FY 2004 rescission. This total reduction/rescission is restored in FY 2005 and FY 2006 Construction to maintain the TEC and project scope.

3. Project Description, Justification and Scope

This project will establish a Nanoscale Science Research Center (NSRC) at BNL. The scientific theme of the BNL Center for Functional Nanomaterials (CFN) is "atomic tailoring of functional nanomaterials to achieve a specific response." The CFN will be a user facility designed to provide a wide range of tools for the preparation and characterization of nanomaterials. The CFN will seek to integrate these unique capabilities with other BNL facilities, including the broad range of synchrotron characterization techniques available at the National Synchrotron Light Source (NSLS).

The CFN will be a new building, located across the street from the existing NSLS. Siting of the CFN will take advantage of close proximity to the Instrumentation Division and the Departments of Physics, Materials Science, and NSLS, which are key interdisciplinary participants in nanoscience research.

The design and scope of the CFN will fulfill DOE mission needs and incorporate input from potential users, gained through many channels including outreach efforts such as workshops. An essential component of the project is to establish an organizational infrastructure open to external users based on peer review. In this way a truly national nanomaterials effort can create breakthrough opportunities. The laboratory areas are organized into seven clusters established to provide the necessary primary user service. Cluster functions cover a wide range of physical and chemical synthesis and characterization. They are designated Nanopatterning, Ultrafast Optical Sources, Electron Microscopy, Materials Synthesis, Proximal Probes, Theory and Computing, and CFN Endstations at NSLS. The CFN will allow users to control processes, tailoring the properties of materials structured on the nanoscale. Some of these materials, all relevant to the BES mission, include piezoelectrics, ferroelectrics, organic films and conductors, magnetic nanocomposites, and catalysts.

This effort will begin with preliminary engineering (Title I) and detailed engineering design (Title II) necessary to construct a BNL Center for Functional Nanomaterials. The engineering effort includes all engineering phase activities, including field investigation, preliminary design, specifications and drawings for conventional construction, final design, preparation of procurement documents for experimental equipment, and construction/equipment procurement estimates.

The completed design will enable construction of a new two-story Laboratory/Office building of approximately 94,500 gross SF. The facility will include clean rooms, general laboratories, wet and dry laboratories for sample preparation, fabrication, and analysis. Included will be some of the equipment necessary to explore, manipulate and fabricate nanoscale materials and structures. Also included are individual offices and landscape office areas, seminar area, transient user space for visiting collaborators with access to computer terminals, conference areas on both floors, and vending/lounge areas. In addition it will include circulation/ancillary space, including mechanical equipment areas, toilet rooms, corridors, and other support spaces.

Technical procurement for the project will include laboratory equipment for the CFN laboratory clusters Nanopatterning, Ultrafast Optical Sources, Electron Microscopy, Materials Synthesis, Proximal Probes, and Theory and Computing as well as for the cluster designated CFN Endstations at the NSLS.

The building will incorporate human factors into its design to encourage peer interactions and collaborative interchange by BNL staff and CFN users and visitors. In addition to flexible office and laboratory space it will provide "interaction areas," a seminar room and a lunch room for informal discussions. This design approach is considered state-of-the-art in research facility design as it leverages opportunities for the free and open exchange of ideas essential to creative research processes.

4. Details of Cost Estimate[a]

	(dollars in thousands) Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications at $2,398K)	3,251	3,107
Project Management – Conv. (1.9% of TEC)	1,541	1,652
Design Management – Conv. (0.4% of TEC)	352	412
Project Management – Tech. (0.2% of TEC)	187	169
Total, Design Costs (6.7% of TEC)	5,331	5,340
Construction Phase		
Technical Facilities		
Equipment	26,394	26,479
Inspection, design & project liaison, testing, checkout and acceptance	263	333
Project Management (0.1% of TEC)	80	136
Total, Technical Costs	26,737	26,948
Conventional Facilities		
Improvements to Land	865	865
Building	26,957	26,965
Utilities	3,700	3,700
Other Construction Costs	827	800
Standard Equipment	903	918
Removal less salvage	0	0
Inspection, design & project liaison, testing, checkout and acceptance	858	875
Project Management (2.5% of TEC)	2,005	1,724
Total, Construction Costs	36,115	35,847
Contingencies		
Design Phase (0.8% of TEC)	651	642
Construction Phase (13.6% of TEC)	10,866	10,923
Total Contingencies (14.5% of TEC)	11,517	11,565
Total, Line Item Costs (TEC)	79,700	79,700

[a]The annual escalation rates assumed for FY 2004 through FY 2007 are 2.5 2.9, 2.8, and 2.6 percent, respectively, using DOE FY 2004 Guidance, January 2002 Update.

5. Method of Performance

Design and inspection of the facilities and equipment will be by the operating contractor and A/E subcontractor as appropriate. Technical construction will be competitively bid, lump sum contracts. To the extent feasible, construction and procurement will be accomplished by fixed-price contracts awarded on the basis of competitive bidding.

6. Schedule of Project Funding

	Prior Years	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	Total
Project Cost								
Facility Cost								
Design	0	733	3,169	1,821	259	0	0	5,982
Construction	0	0	0	13,801	34,983	23,355	1,579	73,718
Total, Line Item TEC	0	733	3,169	15,622	35,242	23,355	1,579	79,700
Other Project Costs								
Conceptual design cost	280	0	0	0	0	0	0	280
NEPA Documentation Costs	10	0	0	0	0	0	0	10
Other ES&H costs	0	0	0	0	0	0	0	0
Other project-related costs [a]	10	0	0	0	0	475	525	1,010
Total, Other Project Costs	300	0	0	0	0	475	525	1,300
Total, Project Costs	300	733	3,169	15,622	35,242	23,830	2,104	81,000
Total, Project Cost (TPC)	300	733	3,169	15,622	35,242	23,830	2,104	81,000

[a] Experimental research will begin at the time of beneficial occupancy of the facility. These research costs are not part of the TPC and are funded by BES.

7. Related Annual Funding Requirements

(FY 2008 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs	18,500	N/A
Total operating costs (starting in FY08 after CD-4a)	18,500	N/A

8. Design and Construction of Federal Facilities

"All DOE facilities are designed and constructed in accordance with applicable Public Laws, Executive Orders, OMB Circulars, Federal Property Management Regulations, and DOE Orders. The total estimated cost of the project includes the cost of measures necessary to assure compliance with Executive Order 12088, "Federal Compliance with Pollution Control Standards"; section 19 of the Occupational Safety and Health Act of 1970, the provisions of Executive Order 12196, and the related Safety and Health provisions for Federal Employees (CFR Title 29, Chapter XVII, Part 1960); and the Architectural Barriers Act, Public Law 90-480, and implementing instructions in 41 CFR 101-19.6"